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Some Spring Fleas from Northeast Tanganyika

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To a person from Oregon there seem to be no seasons in Tanganyika, only dry weather and wet weather. At the moment (January 15), however, there are frog and toad eggs and their tadpoles in all the pools; the weaver birds are building nests by the hundreds and some nests have eggs in them; the game birds are running around with their chicks and the mice are having their families. To an Oregonian all these signs mean Spring, so the title "Some Spring Fleas from Tanganyika." Spring is a very good time to collect fleas.

On arrival in Amani, Tanganyika, September 1961, everywhere there was drought, the most severe in the memory of man. The huge game animals were dying of thirst by the hundreds, the stench of their decaying bodies carried by the wind for miles. Too dry weather is not at all good for collecting fleas.

Then, in a very few days, the heavens opened up and poured down rain in torrents, in cloud bursts, as much as 6, 8, 10 inches in a day and the great game animals, so thirsty days before, mired and died in the quagmire of mud, drowned in the rushing water on its way to the Indian Ocean or the inland lakes. Elephants and lions were reported drifting out to sea; hippos disported themselves in the once small creek running through Nairobi.

The rains have continued for 4 months to bring to Tanganyika, Kenya and Uganda (East Africa) the most devastating floods of the century. The great game animals suffered, man suffered, but the small rodents, which carry most of the fleas

of any area, suffered most. The rats and mice of the lowlands were either drowned or, managing to escape, moved to higher ground. Those on the higher ground forced out of their homes by the flooding of their burrows also moved to higher levels. All in all, this shifting of the population caused the mice to lose their hitch hikers, the fleas, and many taken were without these insects. After 4 months, rodents taken in these flooded areas had not yet found their natural fleas, and were totally without them.

However, by diligent search, enough sheltered spots could be found to take a fair catch of mice, and during the 4 month period of this report 350 were taken and examined and from them 800 fleas were recovered. For host identification 150 study skins were made and 250 slides of the fleas were set up.

This paper with its records shall act as the semi-annual report to the National Science Foundation for grant G14023 and is the fifth paper of twelve so far written by the author under this grant.

"Funza" The Fleas "Viroboto"

1. ***Tunga penetrans*** (Linnaeus, 1758)

This is the "Funza" of Swahili. On the second day at Amani the assistant director was pleased to hand in, in alcohol, a specimen which his wife had just extracted from under his toenail. The only thing at hand about this tropical nuisance flea is from Tilman, "Snow on the Equator," 1937, page 11, where in part he says: "There were however, one or two drawbacks to an earth floor. Encouraged by ideal conditions, the jigger flea made its appearance. House boys, hens and dogs are the main source of this flea infection. . . . The jigger is indigenous to South America, and is supposed to have been brought over to the west coast of Africa in the sand ballast of a ship early in the last century. From there, within a short time it spread across Africa to the east coast." Merifeld, "Gorillas Were My Neighbors," Corgi Ed., 1960, page 68, writes: "It may be that only people with experience of chimpanzees will credit Bo-Bo's (Merifield's pet chimp) most remarkable and useful accomplishment, but it is true enough. One of the worst pests of tropical Africa are

the tiny fleas called jiggers, which burrow unnoticed under the skin of one's toes and set up irritation and infection. Native children are often permanently crippled by these parasites, and at the end of each day it is always a wise precaution to have one's feet examined. The usual way of getting them out is with a fine splinter of bamboo, and this can be a painful operation unless performed by an expert. Bo-Bo was as good at it as anyone I knew. You had to sit down beside her, present your feet and a piece of bamboo, and leave the rest to her. With your toes just in front of her nose, so that she had to squint, she would winkle the beastly things out in no time, and she was so skillful at it that the natives would queue up for her attention. Dr. Bo-Bo's evening surgery was a sight to be remembered."

2. *Echidnophaga gallinacea* (Westwood, 1875)

This is the sticktight or tropical hen flea. The tiny insect might easily be overlooked by the investigator for in many cases it buries its head in the skin of the host and fails to be combed or brushed off. It has been seen in large numbers on occasion in north central Oregon imbedded in the head skin of deer mice (*Peromyscus*) and gray diggers (*Citellus*). At the moment the only records are, off:

Praomys (*Rattus*, *Mastomys*) *natalensis microdon* (coucha rat), a female each at Arusha. Oct. 5; at Gonja, Oct. 24.

3. *Echidnophaga aethiops* Jordan and Rothschild, 1906

This tiny flea has taken over most of Africa and usually from bats. The present record is off:

Lavia frons (large-eared hollow-faced bat), Same, 12 miles west from under roof of deserted Masai village hut, Jan. 17, 1962, a male, 3 females from 25 specimens examined.

4. *Pulex irritans* Linnaeus, 1758

The so called "human flea" is well distributed over the world. The Malaria Institute has slides of these fleas, the specimens

being taken out of the "beds of Africans" in the South Pare Mountains adjacent to Gonja, dated February 1959.

5. *Ctenocephalides felis strongylus* (Jordan, 1925)

This is one of the common cat fleas in Africa. It has been reported off a great many domestic and wild animals as well as man. New records are off:

Lepus capensis abbotti (Cape Hare), Same, Oct. 8, 3 pair.

Praomys (*Rattus*, *Mastomys*) *natalensis microdon* (Coucha rat), Gonja, Oct. 24, 1 male.

Tatera robusta vicina (big gerbil), Himo, Oct. 26, 2 males.

Acomys nubilus (spiny mouse), Himo, Oct. 26, 1 female; Same, Oct. 27, 1 female.

Panthera pardus fusca (leopard), Amani, Nov. 7, 5 males, 4 females.

Hyaena hyaena dubbah (hyena), Moshi, Dec. 27, 12 pair.

During the month of January this flea begins to be a nuisance to humans and many Africans make their way to the Institute asking for flea (viroboto) powder with which to powder their dogs. The fleas begin to emerge at this time from the earth floors and board floors of houses to make life miserable to the inhabitants, European and African alike. This is the common nuisance flea of Tanganyika.

6. *Parapulex echinatus* Smit, 1956

This is the true flea of spiny mice but can occasionally be taken off gerbils which use the same range. This genus can always be diagnosed because of the heavy spine-like bristles found on no other known flea and as Smit says in describing this flea, "It is rather amusing that the spiny mouse, *Acomys*, should have such a spiny flea." Records are off:

Acomys nubilus (spiny mouse), 1 each item, Same, Oct. 2, 3 males, 5 females; Oct. 26, 1 male, 2 females; 1 male, 5 females; 1 pair.

Tatera nigricauda spp? (blacktailed gerbil), Same, Oct. 27, 1 female; Jan. 17, 1962, 1 pair.

7. *Xenopsylla brasiliensis* (Baker, 1904)

Collections reveal this flea to be the common rat flea of East Africa. It is found on most rats and rat-like mice. Gerbils and ground squirrels on the same ground carry their own *Xenopsylla*. Records of interest follow. Off:

Rattus rattus kijabius (black rat), Amani, Oct. 12, 2 males, 1 female; Oct. 13, 9 pair; Oct. 27, 1 male; Nov. 2, 1 male; Nov. 3, 2 males, 1 female; Nov. 7, 4 males; Dec. 2, 4 males; Vugiri, Dec. 25, 2 males, 1 female.

Black rats are one of the most common rodents taken here at Amani and vicinity. They are everywhere. Usually they are without fleas, about 2/3rds carry none. Of 50 examined during the period 30 carried no fleas and a nest with 7 young was without a parasite of any kind.

Praomys natalensis microdon (coucha rat), (10), Arusha, (3), Oct. 5, 9 males, 11 females; (1) Oct. 6, 5 pairs; (3), Oct. 7, 14 males, 10 females. Three specimens examined Dec. 30 carried only *D. lyppusus*.

Aethomys chrysophilus voi (rock or bush rat), (9), Gonja, (3), Sept. 30, 30 males, 27 females; (3) Oct. 20, 17 males, 6 females; (3), Dec. 25, 12 males, 13 females.

Arvicanthus abyssinicus neumanni (grass mouse), Arusha, Dec. 31, a pair off 1 specimen.

8. *Xenopsylla difficilis* Jordan, 1925

This is the common gerbil flea of northern Tanganyika. Interesting records are, off:

Tatera robusta vicina (big gerbil), (6), Himo, (1), Oct. 26, 12 males, 13 females; Korogwe, (1), Dec. 21, 2 males; Moshi, (1), Dec. 28, 3 pair; Arusha, (3), 13 males, 12 females.

Tatera nigricauda spp? (blacktailed gerbil), (3), Same, (1), Oct. 27, 7 males, 16 females; (1), Nov. 28, 3 pair; (1), Jan. 17, 1962, 2 females.

9. *Xenopsylla humilis* Jordan, 1925

This is the second most common gerbil flea of northern Tanganyika. It seems to prefer the *robusta* gerbils to the *nigricauda* gerbils. Records are, off:

Tatera robusta vicina (big gerbil), (3), Korogwe, (1), six miles south, Dec. 21, 2 males; Moshi, (1), 10 miles south at gravel pit, Dec. 28, 3 pair; Arusha, (1), 6 miles west, Dec. 31, 1 male.

10. *Xenopsylla* near *robertsi* probably new ssp.

This flea, which does not quite follow the pattern of true *robertsi*, has been taken off:

Praomys natalensis microdon (coucha rat), Arusha, 7 miles west from bank of creek running through village Ngaramtoni Juu, Oct. 5, 15 males, 3 females.

11. *Synosternus somalicus* (Jordan and Rothschild, 1908)

This flea has been taken only off the African ground squirrel, *Xerus rutilus saturatus* at Same, Nov. 28, 1 male, 3 females.

12. *Stivalius torvus* (Rothschild, 1908)

In the period of this study only 12 pairs of this flea have been collected and these only at Amani. All are off what seems to be the true host *Praomys delectorum taitae* which has been dubbed "African deer mouse" due to its striking similarity to the American *Peromyscus*. The mouse is usually taken at the base of large jungle trees. This flea was taken on the first day of trapping and has appeared sparingly, and singly but consistently during the 4 months. The 24 fleas were recovered from 45 of the mice.

13. *Stivalius alienus* Smit, 1958

Only one pair of this flea has been taken. They were off a specimen of *Crocidura occidentalis* (shrew) at Amani on Nov. 10. Although 12 other shrews were examined during the period, none carried fleas.

14. Chimaeropsylla potis potis Jordan and Rothschild, 1913

This flea was originally collected off an elephant shrew here at Amani in 1904 by a member of the staff of the old German botanical garden. The specimens were sent to the Berlin Museum and later made their way to Tring where they were described. A vial of these fleas was waiting here. It bears the data, off *Petrodromus s. sultan* (elephant shrew), Amani, Feb. 1960. The vial contained 3 males, 11 females.

15. Dinopsyllus lypusus Jordan and Rothschild, 1913

This large flea, up to 5 mm, is the common flea of northeast Tanganyika, and is found sooner or later on all mice examined as the following records show. Off:

Tatera robusta vicinia (big gerbil), (1), Arusha, Dec. 31, a female.

Acomys wilsoni (spiny mouse), (1), Korogwe, Dec. 22, a female.

Arvicanthus abyssinicus neumanni (grass mouse), (1), Arusha, Dec. 30, 2 pair.

Lemniscomys griselda rosalia (one strip grass mouse), (1), Korogwe, Dec. 21, 3 pair.

Pelomys fallax iridescens (creek rat), (3), Arusha, (1), Oct. 7, 2 males, 3 females; Amani, (2), Sept. 25, a pair; Oct. 3, 2 females.

Rattus rattus kijabius (black rat), (5), Amani, Sept. and Oct., 3 males, 2 females.

Praomys natalensis microdon (coucha rat), (6), Arusha, (3), Oct. 6, 3 males, 8 females; Korogwe, (1), Dec. 21, a female; Arusha, (2), Dec. 30, 8 males, 3 females.

Lophuromys sikapusi manteufeli ("orange-bellied mouse"), (8), Amani, Oct., Nov., Dec., Jan., 9 males, 17 females.

Praomys delectorum taitae (African deer mouse), 15 at Amani through the 4 months, carried 16 males, 8 females. Specimens taken from this mouse are dwarfed and very pale and it appears that this flea cannot feed on this mouse.

Lophuromys flavopunctatus margarettae (tan-bellied mouse),

seems to be the true host of this common flea. Of the 56 examined through the 4 months, 17 were without fleas, 39 carried 196. On Nov. 2 a specimen examined carried 20 of these giants and on Dec. 20, 14 were taken off another. Totaled, 293 of these fleas were taken off 80 mice of the above types.

16. *Ctenophthalmus* near *calceatus* probably new ssp.

Although 12 types of *Ctenophthalmus*, all described prior to 1939, are listed from adjacent Kenya, only five specimens have been taken off the 350 mice examined. 3 females and 2 males are all off *Lophuromys f. margarettae*, Oct. 18, a female; Dec. 2, a male; Dec. 14, a male, these from Amani; Dec. 28, a female each off 2 mice at Vugiri.

Gazetteer: The location of this study is in northeast Tanganyika and covers an area about 50 miles wide along the Kenya border, extending from the Indian Ocean some 350 miles northwest past Mt. Kilimanjaro to Arusha at the base of Mt. Meru. Located along the main Tanga-Arusha highway (road) at about 50 mile intervals are, beginning with Tanga on the Ocean at sea level, Amani at 3,500 (20 miles northwest off highway), Korogwe at 900 feet, Vugiri at 900 feet (20 miles north off highway), Gonja at 2,700 feet, Same at 2,700 feet, Himo at 2,400 feet, Moshi at 2,500 feet and Arusha at 4,500 feet.

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